Should the Antibiotic Resistance of Group B Streptococcus be tested or is it just an extra expense?

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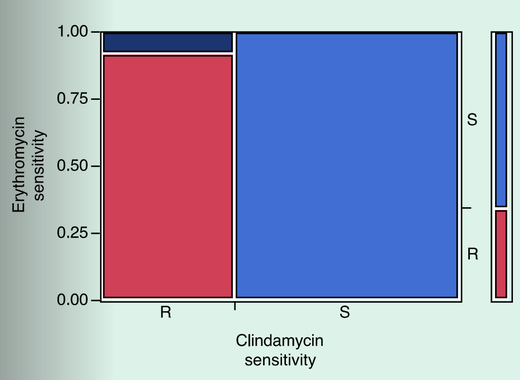
Abstract

Goal: Determination of sensitivity of Group B streptococcus (GBS) isolates to penicillin, erythromycin, clindamycin, tetracycline and vancomycin.

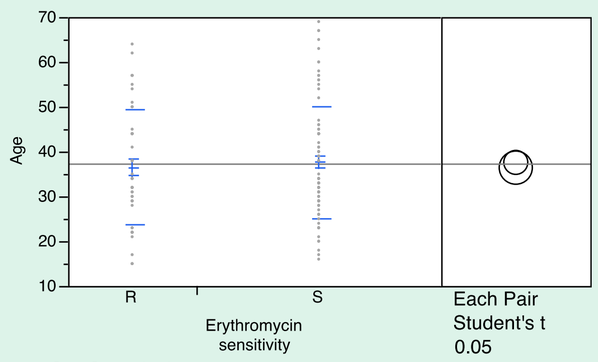
Material: The study was done with female patients from Bitola, Macedonia during the period of 10/2010-05/2013 that included 132 patients. 42 of the patients were pregnant and routinely screened between the 35-37 gestational week for the presence of GBS, and the rest of the patients were tested because they already had symptoms from GBS infection.

Expected results: The results in the study are expected to show that GBS has a high percentage of resistance toward certain antibiotics. This information is expected to raise awareness in the country for the importance of the testing of the antibiotic resistance of GBS, and to advocate for specific protocols to be prepared and recommended by the Ministry of Health that will help properly prevent or treat infection with GBS in patients.



Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	144.498	<.0001*
Pearson	117.676	**<.0001***

Hypothesis: there is relationship between the sensitivity of Erythromycin and Clindamycin
Chi square is <0.0001 which proves the hypothesis true that there is a strong positive relationship between the two antibiotics, and the sensitivity/resistance of one is a good predictor of the sensitivity/resistance of the other one.

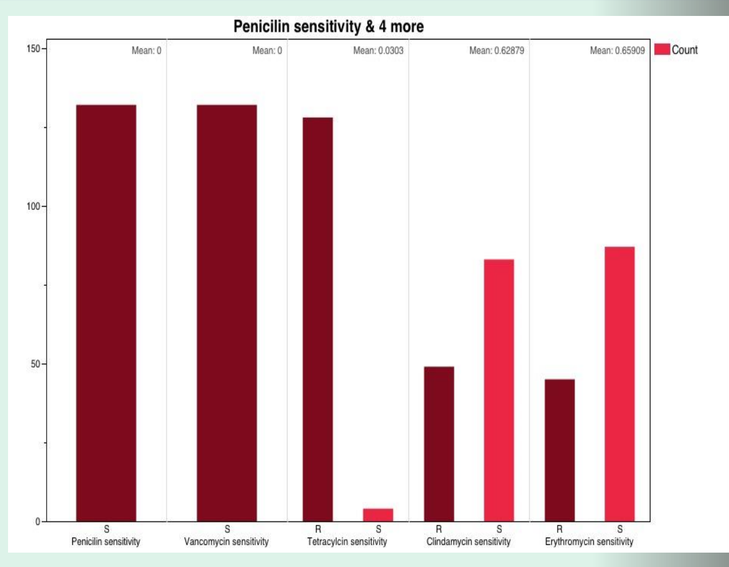


Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean
R	46	36.4130	12.8713	1.8978
S	88	37.5909	12.5457	1.3374

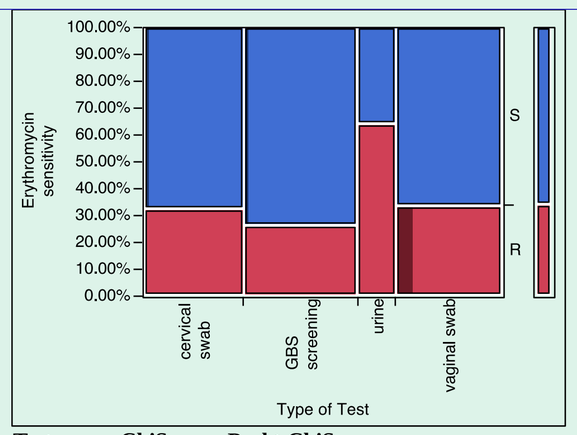
Prob > |t| 0.6132

Hypothesis: There is a difference in the age group of patients who are sensitive or resistant to Erythromycin.
The t-test for erythromycin by age, shows us that there isn't a significant difference in the age group of patients who are sensitive or resistant to Erythromycin. The mean age of patient resistant to Erythromycin is 36.4, and the mean of patients who are not resistant is 37.5. The p value of 0.6132 also confirms that the hypothesis is false.



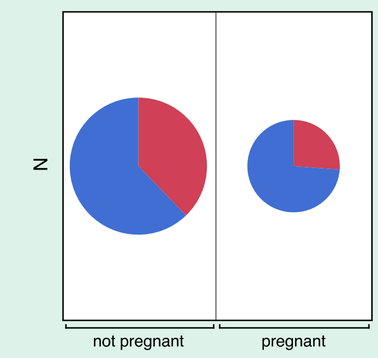
Among the 5 antibiotics used to treat GBS, penicillin and vancomycin are always successful and tetracycline is never successful. However, many people are allergic to penicillin, and vancomycin is given intravenously at the hospital which is inconvenient for patients and expensive. That is why Clindamycin and Erytromycin have become the standard therapy for patient with allerty to Penicillin

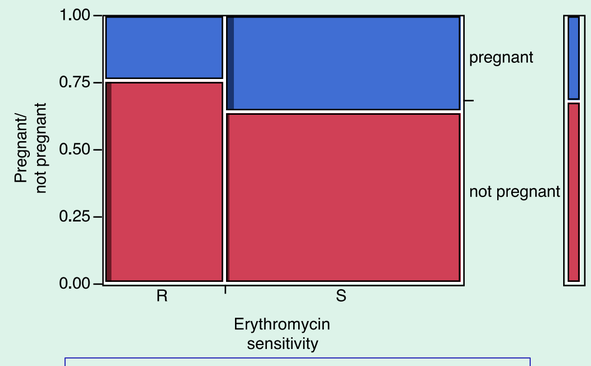
Is the resistance level of GBS high enough to alarm the health authorities?



Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	6.565	0.0871
Pearson	6.903	0.0751

The Chi square test shows that the percentage of patients who are infected with GBS that is resistant to Erythromycin therapy starts at 25% and goes as high as 60%! Even though the Chi Square Person value is not significant enough, it does show that conducting an antibiotic sensitivity test for GBS would significantly decrease the percentage of patients who are treated with the wrong therapy.





Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	1.755	0.1853
Pearson	1.711	0.1908

25% of pregnant women are treated with the wrong antibiotic! This is very alarming, because this practice risks the chance for newborns to be infected with GBS which can lead to sepsis(infection of the blood), pneumonia (infection of the lungs) or meningitis, all serious conditions that can compromise the life of the baby.

Conclusion:

This study shows alarming results in the level of resistance of Group B streptococcus to Erythromycin and Clindamycin. By the current recommendation of the Ministry of Health in Macedonia, these two antibiotics are prescribed to patients who have allergy to Penicillin without testing for antibiotic sensitivity because of the cost of testing. As seen from the results, 25% of pregnant women and 30% of women who are not pregnant are treated with an antibiotic that is not effective in treating GBS. Wrong treatment is especially dangerous in pregnant women who can pass GBS to their babies as infection with GBS in newborns can seriously threaten the life and health of the newborn. GBS is proven to be always sensitive to penicillin and vancomycin therapy and always resistant to tetracylcline. In addition, the resistance/sensitivity to Clindamycin and Erythromycin is the same in most cases. A possible solution to the cost of testing, therefore, would be doing one single test to determine GBS sensitivity to either Erythromycin or Clindamycin.

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